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EXAMINER

HOGANS, DAVID L

ART UNIT PAPER NUMBER

2813

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/819,688

Applicant(s)

NATORI, EIJI

Examiner

David L. Hogans

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on October 31, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the Request for Reconsideration filed on October 31, 2003.

Status of Claims

Claims 1-13 and 15-17 are pending. Claims 14 and 18-33 have been cancelled.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-13 and 15-17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for deposition of ferroelectric material like PZT and BST, does not reasonably provide enablement for deposition of all ceramic material. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. While the specification is enabling for the deposition of ferroelectric materials, it is not enabling for the deposition of all matter made from nonmetallic minerals (i.e. – ceramics).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4-8, 11 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by JP402179880 to Koketsu et al.

Claim 1

In reference to Claims 1 and 5, Koketsu et al. teaches:

- forming a oxide ceramic film on a substrate by mixing a gasified fine particle raw material (1) with an active species (oxygen 9) having high kinetic energy, wherein the fine particle raw material is provided with kinetic energy from the active species and the oxide ceramic film is formed by misted CVD or LSMCD (200)
(See Abstract and Constitution)

The Examiner notes that the microwave source (6) provides energy to the gases 3, 5 and 9, thereby, making them active. Additionally, gas 9 also imparts its energy to the fine particle raw material gas/mist.

Claim 4

In reference to Claim 4, Koketsu et al. teaches:

- electrically charging the fine particles (1) (See Abstract and Constitution)

The Examiner notes that the fine particles are charged via friction from flowing through the process pipes (noting Applicant's specification page 6 lines 14-18).

Claim 6

In reference to Claim 6, Koketsu et al. teaches:

- the active species (oxygen) is a radical or ion (9) (See Abstract and Constitution)

Claim 7

In reference to Claim 7, Koketsu et al. teaches:

- the active species is radical or ion of the raw material species (1) (See Abstract and Constitution)

The Examiner notes that the fine particle raw material can act as the active species, as well, because it too is subjected to the microwave source.

Claim 8

In reference to Claim 8, Koketsu et al. teaches:

- the active species is an ion of oxygen (9) (See Abstract and Constitution)

Claim 11

In reference to Claim 11, Koketsu et al. teaches:

- wherein the active species is fed to the substrate in an accelerated state (6 and 9) (See Abstract and Constitution)

Claim 15

In reference to Claim 15, Koketsu et al. teaches:

- wherein the ceramic film is a dielectric/ceramic oxide (See Abstract and Constitution)

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4-11 and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,110,531 to Paz de Araujo et al. (hereinafter Paz).

Claim 1

In reference to Claims 1 and 5, Paz et al. teaches:

- forming a ferroelectric film on a substrate by mixing a gasified fine particle raw material (113A, B and C) with an active species (112A, B and C) having high kinetic energy, wherein the fine particle raw material is provided with kinetic energy from the active species and the ferroelectric film is formed by misted CVD or LSMCD (200) (See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

The Examiner notes that the plasma source (137) and the UV source (135) provide energy to the gases 112A, B and C, thereby, making them active. Gases 112A, B and C then impart their energy to the fine particle raw material gases/mist.

Claim 4

In reference to Claim 4, Paz et al. teaches:

- electrically charging the fine particles (113A, B and C) (See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

The Examiner notes that the fine particles are charged via friction from flowing through the process pipes (noting Applicant's specification page 6 lines 14-18).

Claim 6

In reference to Claim 6, Paz et al. teaches:

- the active species (112A, B and C) is a radical or ion (135 and 137) (See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

Claim 7

In reference to Claim 7, Paz et al. teaches:

- the active species is radical or ion of the raw material species (113A, B or C)
(See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

The Examiner notes that the fine particle raw material can act as the active species, as well, because it too is subjected to the plasma source and the UV source.

Claim 8

In reference to Claim 8, Paz et al. teaches:

- the active species is an ion of oxygen (112C) or nitrogen (112B) (See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

Claims 9 and 10

In reference to Claims 9 and 10, Paz et al. teaches:

- the active species is an ion or radical of inert argon gas (112A) (See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

Claim 11

In reference to Claim 11, Paz et al. teaches:

- the active species is fed to the substrate in an accelerated state (135 and 137)
(See column 5 lines 21-30 and lines 45-56, columns 8-10 lines 39-63, columns 13-14 lines 50-10 and Figures 3 and 4)

Claim 15

In reference to Claim 15, Koketsu et al. teaches:

- wherein the ceramic film is a dielectric (See columns 15-18 lines 60-55)

Claims 16 and 17

In reference to Claims 16 and 17, Koketsu et al. teaches:

- wherein the dielectric is formed at a temperature of 450 °C or less (See column 14 lines 26-37 and the Abstract)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP402179880 to Koketsu et al. in view of 6,146,905 to Chivukula et al.

Claims 2 and 3

Incorporating all arguments of Claim 1 and noting that Koketsu et al. fails to explicitly teach a diameter of fine particle that is 0.01 micrometer or less.

However, Chivukula et al., in column 6 lines 37-40, teaches depositing a ferroelectric dielectric with a grain size of 10 nm. Further, Chivukula et al. discloses that a superior high frequency response is noted in integrated circuits that are formed from reproducible small grain size ferroelectric layers.

It would have been obvious to one of ordinary skill in the art to modify Koketsu et al. by incorporating a ferroelectric grain size of 10 nm, as taught by Chivukula et al., to produce a superior high frequency response in ferroelectric films.

8. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP402179880 to Koketsu et al. in view of 6,120,846 to Hintermaier et al.

Incorporating all arguments of Claim 1 and noting that Koketsu et al. fails to explicitly teach a film-forming region on a substrate having an affinity for ceramics with a non-film-forming region having no affinity for ceramics.

However, Hintermaier et al., in columns 3-4 lines 30-44 and Figure 1, teaches a ferroelectric dielectric material that is selectively deposited on a bottom electrode (18)

(having affinity to ceramics) and not deposited on the base member (11) (not having affinity to ceramics).

It would have been obvious to one of ordinary skill in the art to modify Koketsu et al. by incorporating a ferroelectric dielectric material that is selectively deposited on a bottom electrode and not deposited on the base member, as taught by Hintermaier et al., to allow for the fabrication, in one oxide deposition step, of ferroelectric and nonferroelectric capacitors.

Response to Arguments

4. Applicant's arguments filed October 31, 2003, have been fully considered but they are not persuasive.

Claims 1, 4 and 6-11

The Applicant contends that 6,110,531 to Paz de Araujo et al. (hereinafter Paz) fails to teach Claims 1, 4 and 6-11. The crux of Applicant's arguments is that Paz et al. does not disclose an active species that provides kinetic energy to the raw material gases. The Applicant supports their position by arguing that the carrier gas of Paz et al. does not provide kinetic energy to the raw material gas and, as such, is not deemed active. The Examiner maintains that Paz et al. teaches an active species and refers the Applicant to the rejection of Claim 1 provided above for verification. The Examiner further notes that Paz et al. teaches in Figure 3 a plasma generator (137) and a UV

generator (135) coupled to the reaction chamber. The Examiner maintains that the argon, nitrogen or oxygen introduced into the chamber, when excited by the plasma or UV, will transfer its energy to the raw material. Therefore, Paz et al. teaches an active species of oxygen, nitrogen or argon, as enumerated by Applicant's specification on page 7, that can be combined with a raw material gas so as to deposit a ceramic film. Finally, the Examiner notes that Applicant's specification (noting pages 7 and 11) teaches that their active species is produced from one of argon, oxygen, or nitrogen that is exposed to a microwave or ECR (i.e. – plasma) source.

Claims 1-3, 5, 12, 13 and 15-17

5. Applicant's arguments with respect to claims 1-3, 5, 12-13 and 15-17 over 6,232,167 to Satoh et al. in view of 5,456,945 to McMillan et al. in view of 5,563,762 to Leung et al. in view of 6,207,236 to Araki et al. have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361 or (571) 272-1691, after February 9, 2004. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (703) 308-4940. The fax phone

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number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

DA

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ERIK J. KIELIN
PRIMARY EXAMINER